



# REC Biannual Report

October 2011 – March 2012

Leader with Associate Cooperative Agreement No. RLA-A-00-08-00051-00

Project duration: September 30, 2008 – September 29, 2012



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## List of Abbreviations

CPAF	Common Performance Assessment Framework
DFID	(UK) Department for International Development
EDPRS	Education Economic Development and Poverty Reduction Strategy
ESSP	Education Sector Strategic Plan
GoR	Government of Rwanda
ICT	Information and Communication Technology
IEE	International Education Exchange
JICA	Japanese International Cooperation Agency
JRES	Joint Review of the Education Sector
KOICA	Korea International Cooperation Agency
L3	Literacy, Language and Learning
MINEDUC	(Rwanda) Ministry of Education
NICI III	National Information and Communication Infrastructure Plan
OdeL	Open, Distance, and eLearning
OER	Open Educational Resources
REB	Rwanda Education Board
REC	Rwanda Education Commons
RURA	Rwanda Utilities Regulatory Agency
TCE	(Rwanda) Teacher College of Education
TTC	(Rwanda) Teacher Training College
SMASSE	Strengthening Mathematics and Science in Secondary Education
UNICEF	United Nations Children’s Fund
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
VSO	Volunteer Services Overseas



## Progress in Year Four

### *Executive summary*

In Y1, REC established local and international partnerships, and in Y2, those partnerships bore fruit: educational materials, educational technology and channels, and agreements with local institutions to deliver these products. In Y3, REC began to reach teachers and learners.

In Y4, REC seeks to refine our most successful activities and clearly demonstrate the extent to which they improve education in Rwanda. We will also work with partners to ensure the continuity of key activities. The Government of Rwanda (GoR) requested a proposal for a REC II, which was developed in alignment with Rwanda's ICT and education policies. This has been completed, and plans for continuity of REC activities are described below (see "Sustainability").

Program highlights during this period include the gradual stabilization of the REC online community and the growth and demand for the REC *Smart Learning* television program. In addition, two subcontractors delivered final reports on building on Internet investments and adding mission-supporting revenue streams, both of which have been shared with the Rwanda Ministry of Education (MINEDUC). A third subcontractor, funded through a \$77,000 grant from Google, began work improving the REC portal.

Also during this period, REC launched and maintained partnerships around the production of digital and video content, with local groups such as Volunteer Services Overseas and non-local organizations such as the U.S. Department of Agriculture. REC also began working with the USAID/Rwanda Language, Literacy, and Learning project, to identify how to use REC technology channels for the wider distribution of literacy materials in Rwanda.

Finally, during this period, the data for the REC impact evaluation were gathered. The full report will be completed by June 2012; preliminary findings for teachers at TTCs and TCEs are described below (see "Impact evaluation"). Key findings include increased teachers' knowledge of their subject(s) and of student-centered methods for teaching their subject(s).



## Content

- **Online library:** The REC digital library ([www.educationcommons.rw/library](http://www.educationcommons.rw/library)) now contains resources for every unit in the secondary curriculum, several units in the primary curriculum, and several units in critical professional development areas.<sup>1</sup> Materials production followed the REC “mixed content” strategy of combining *imported content*, *adapted content*, and *locally produced content*. Locally produced content was created by Rwandan teachers; adapted content was revised from materials created by new partners (see next item); content was imported from various partners.<sup>2</sup>
- **Video materials:** In Y3, demand from the Government of Rwanda resulted in the doubling of airtime for the REC *Smart Learning* program. To meet this demand, and to improve the quality of the instruction demonstrated in the programming, REC partnered with four organizations: Volunteer Services Overseas (VSO); the International Education Exchange (IEE); the Strengthening Mathematics and Science in Secondary Education (SMASSE) program, funded by JICA; and the US Peace Corps. REC filmed volunteers, mentors, and teachers from these organizations to demonstrate active, child-centered teaching methods. (See Appendix A for a description of partner activities filmed.)
- **High-stakes exam preparation:** In the first half of Y4, REC distributed 7 test preparation materials to rural students studying for high-stakes exams at the end of grade six (P6), nine (S3), and twelve (S6). These materials, delivered via newspaper inserts, are for many students their only study aids for exams that largely determine their future schooling and vocation.
- **Encyclopedia distribution:** In Y3, REC partnered with World Bank to distribute six sets of encyclopedias to all TTCs and TCEs. The encyclopedias, which include general reference, science, and children’s education materials, are a major contribution to campus libraries. These encyclopedias have been distributed to 9 teacher colleges; the remainder will receive encyclopedias by June 2012.

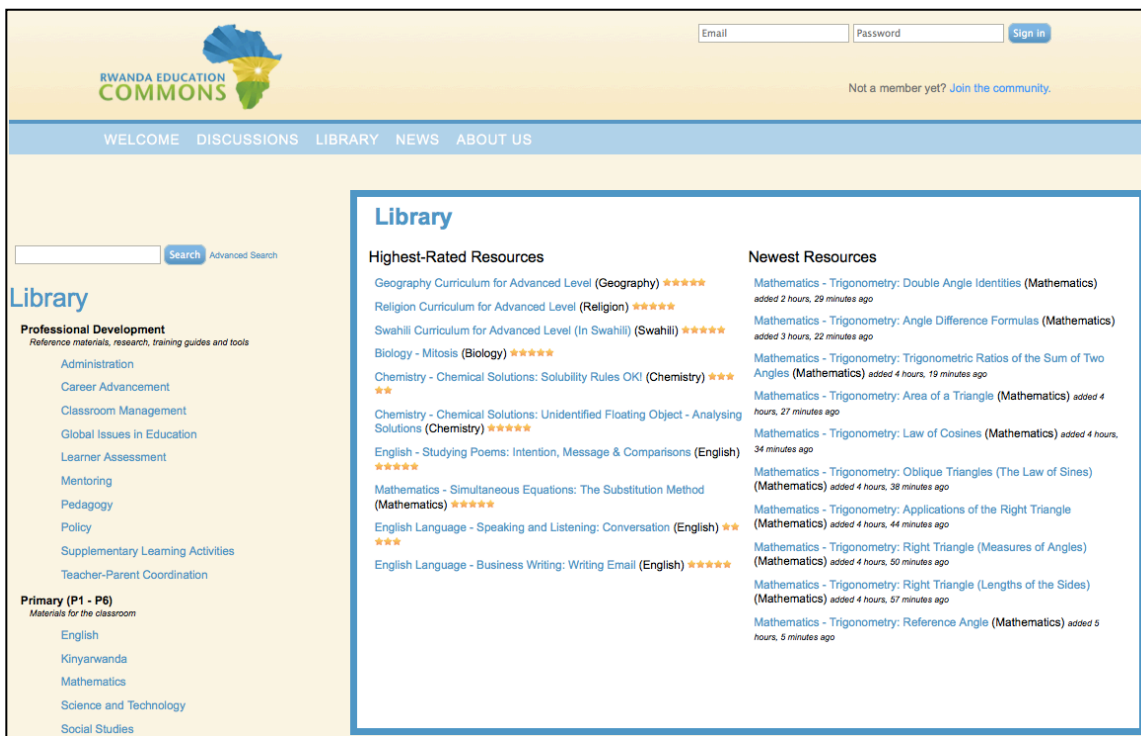
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<sup>1</sup> Professional development areas include Administration, Career Advancement, Classroom Management, Global Issues in Education, Learner Assessment, Mentoring, Pedagogy, Policy, Supplementary Learning Activities, and Teacher-Parent Coordination.

<sup>2</sup> For more on the REC mixed e-learning content strategy, see the REC presentation on a panel on Open Education Resources (OER) from the 2011 eLearning Africa conference in Dar-es Salaam, Tanzania (“A mixed e-learning content strategy”) here:

<http://library.educationcommons.rw/library/userslib/ahpzfmdsb2JhbC1sZWYybmluZy1wb3J0YWwtNnITCxlLTGllUmVzb3VyY2UYotMfDKIBE2VkdWNhdGlvbmlvbnV1bnMucnc>

**Statistical snapshot:** In this period, 3,417 teacher tools were produced and 59 *Smart Learning* broadcasts (totaling 144 hours) aired. 52 exams were distributed in 10 newspaper editions, reaching an estimated 300,000 students.



The screenshot shows the RWANDA EDUCATION COMMONS website. At the top, there is a navigation bar with links: WELCOME, DISCUSSIONS, LIBRARY, NEWS, ABOUT US. Below this, a search bar is visible. The main content area is titled 'Library' and is divided into two columns. The left column lists categories under 'Professional Development' and 'Primary (P1 - P6)'. The right column displays 'Highest-Rated Resources' and 'Newest Resources' with various educational materials, each accompanied by a star rating and a timestamp indicating when it was added.

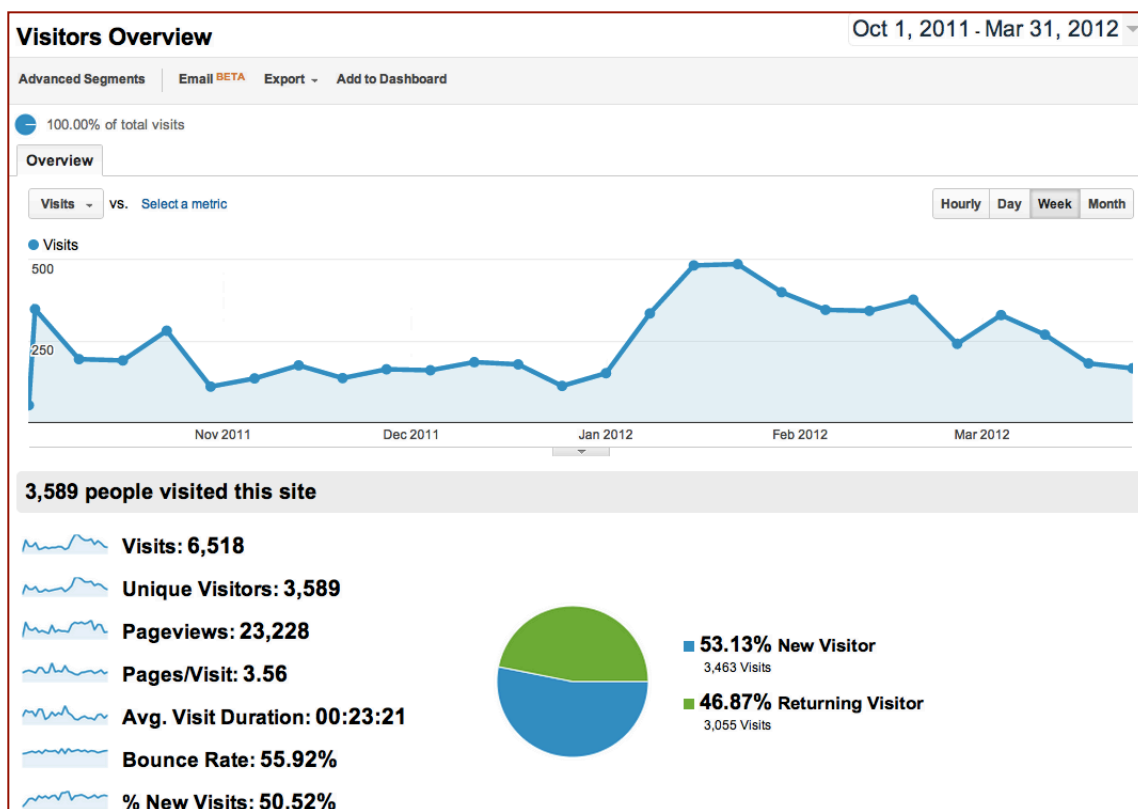
Screen capture of the REC online library ([www.educationcommons.rw/library](http://www.educationcommons.rw/library))

## Technology channels

- **Google grant for improving the REC online portal:** Google.org, which partnered with REC to produce the online portal, awarded a grant of \$77,000 to FHI for improving the portal. In November 2011, REC subcontracted with a Rwandan IT firm, K&K IT Solutions, Inc., to implement 21 changes to the portal (see Appendix B), and to train the REC engineering team to make further changes as necessary. The new REC portal (v3.0) will launch in May 2012.
- **Teacher training colleges online:** All of Rwanda's public teacher training colleges for future primary teachers and teacher colleges of education for future secondary teachers are now online. Connectivity remains subsidized at 80% of actual costs by the Rwanda Utilities Regulatory Agency (RURA) and at 20% by

USAID, through REC. MINEDUC and REC are now finalizing and agreement for MINEDUC to take over USAID connectivity costs by June 2012.

- **Tracking portal use:** REC trainings for new users were reduced in this period, and portal traffic dropped correspondingly. However, our aim in this period was not to increase portal use, but to stabilize portal use with minimal intervention from REC staff, towards the overall goal of leaving behind a self-sustaining online community. Google Analytics shows that after winter vacation, and despite country-wide Internet outages throughout much of February, a core of recurrent users has developed. These are our champions: in the second half of Y4, we will look to empower these champions to lead further online community activity.
- **Where portal users are coming from:** Drilling down further into the Google Analytics reveals that nearly a quarter of visitors during this period came from outside Rwanda. Most of these visitors came from the neighboring countries of Burundi, Uganda, and Kenya. Some of this activity may in fact be from TTCs near a border (such as TTC Matimba, near the Uganda border), where Google Analytics mistakes the location, but it is likely that some portal use has spread.



Google Analytics data of REC portal visits from October 2011 through March 2012.

## Capacity building

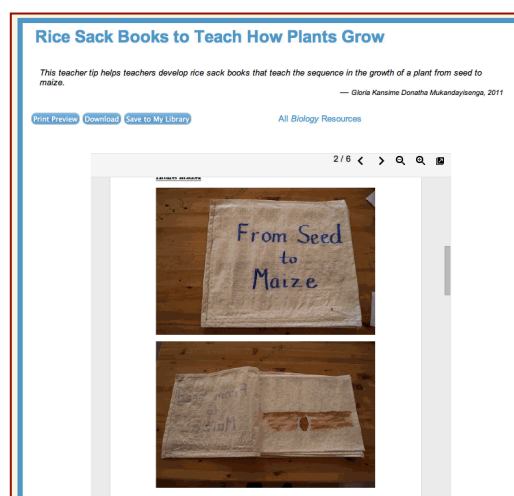
- **Teacher training:** REC no longer trains teachers directly; instead, IT instructors at TTCs conduct trainings to impart skills needed to use the portal, as well as pedagogical strategies for incorporating ideas and materials found on the online community into lesson planning. In this period, IT instructors trained 592 future teachers. REC did conduct follow-up trainings for 12 IT instructors during this period, reinforcing methods learned at earlier trainings and providing troubleshooting support for technical issues.



A trainer and IT instructor at TCE Rukara

## Partnerships

- **Ongoing local partnerships:** The Rwanda Education Board (REB) is now responsible for the implementation of Rwanda's education policy. MINEDUC is now responsible only for establishing policy and allocating funds. In this period, REC began meeting regularly with REB, particularly Evode Mukama, REB's director for IT. (See the Sustainability section below for REB's possible role in the future of REC.)
- **New local partnerships:** As noted above, the demand for additional content for the REC *Smart Learning* broadcast led to new partnerships with VSO, IIE, JICA, and the US Peace Corps (described in Appendix A). In addition, REC has begun working with the USAID literacy program in Rwanda (the Literacy, Language, and Learning program, or L3) to identify synergies. Specifically, REC will be making the video and online channels available to L3, and L3 will deliver literacy content



A screen capture of a library resource created by students working with VSO volunteers.





for inclusion in *Smart Learning* broadcasts and dissemination via the REC education portal. Finally, REC is now a member of the Rwanda Education NGO Coordination Platform (RENCNCP), and is listed on their web site ([www.rencn.org](http://www.rencn.org)).

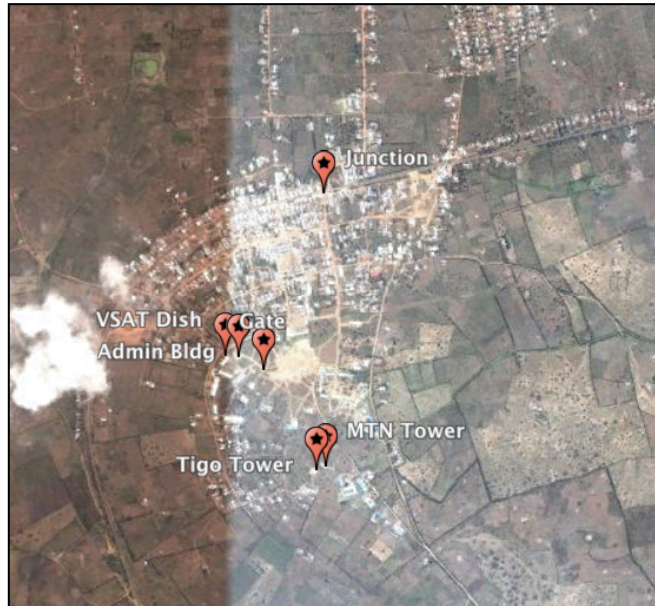
- **International partnerships:** International partners continued to contribute to the development of content and technologies in this period. **Google** volunteers trained K&K Solutions, Inc. in the improvement of the REC portal. REC continued to distributed World Book encyclopedias, USDA school gardening manuals, and student and teacher workbooks from Project WET, a water education project, to TTCs, TCEs, and some secondary schools.

### *Program sustainability*

- **Strategy:** As described in the previous biannual report, FHI has pursued a two-pronged strategy for sustaining REC activities. The first approach, devised at the request of MINEDUC, has been to develop a full concept note and budget for a follow-on program. The concept note is aligned with five policies and planning documents that guide the GoR's approach to ICT in education (see Appendix C for a map of where the REC II proposal would fulfill policy objectives). REC is working with MINEDUC and independently to meet with donors (including DFID, JICA, and KOICA, and UNICEF) to determine the feasibility of a fully funded REC II.
- **Handover:** In the event that FHI and MINEDUC cannot find funding for a REC II, FHI will turn over ongoing activities to REB. A full handover plan will be completed by May 2012, in collaboration with the REB-IT directorate.
- **Business plan for ICT revenue:** REC submitted a business plan for the long-term viability of an ICT in education trusted government partner to MINEDUC. The plan, drafted in consultation with Nile Bridge Partners, a Rwandan consulting firm, includes a market analysis and concrete proposals for leveraging REC assets to provide revenue for support of ICT in education works.

- **Internet connectivity:**

MINEDUC is planning to assume Internet costs for TTCs and TCEs beginning in June 2012. In March 2012, REC submitted a plan for the maintenance and expansion of connectivity from USAID's initial investment. The plan, called the Sustainability Connectivity Report, was drafted by Inveneo, a nonprofit specializing in



identifying ICT solutions for low-income environments, with rich experience in sub-Saharan Africa. It includes concrete recommendations for how to maintain, expand, and reduce the cost of Internet connectivity, and plots the coordinates of Rwanda's connectivity infrastructure using Google Earth. (See Appendix D for the executive summary of this report, as well as their five key recommendations.)

Coordinates of the connectivity infrastructure around TTC Matimba, from the REC Sustainability Connectivity Report.

### *Staffing changes*

Two new staff members joined the REC team during this period:

- Frank Higirow was hired to fill the position of REC Communications Officer. The position will be 50% time; during the remaining time, Mr. Higirow will serve as Communications Officer for the FHI 360 Country Office.
- Bizimana Hassan was hired for the new position of REC Associate Video Producer. The position was created because of the expansion of the *Smart Learning* television program from 2 hours/week to 4 hours/week.

### *Impact evaluation: preliminary findings*

This section reviews preliminary findings from the REC impact evaluation study, conducted in February and March of 2012. A full report will be issued by June 2012 and include description of correlations between use and impact, regression analysis, and a full discussion of findings.

#### Introduction

During February-March 2012 data were collected from instructors and students in all ten teacher training colleges (TTCs) in Rwanda (see Table 1). The purpose of this data collection was to examine TTC instructors' and students' exposure to REC resources and the impact such exposure had on their capabilities to perform various pedagogical roles. A full report will be issued in June 2012.

Institution	Instructors	Students
<b><i>Bicumbi TTC</i></b>	13	34
<b><i>Byumba TTC</i></b>	17	36
<b><i>Gacuba TTC</i></b>	15	38
<b><i>Kirambo TTC</i></b>	14	36
<b><i>Matimba TTC</i></b>	15	36
<b><i>Mbuga TTC</i></b>	14	37
<b><i>Mururu TTC</i></b>	15	37
<b><i>Rubengera TTC</i></b>	15	36
<b><i>Save TTC</i></b>	15	38
<b><i>Zaza TTC</i></b>	14	38
<b><i>TOTAL</i></b>	147	366

Table 1: Sample of Instructors and Students by Institution

The questionnaires administered focused on past and current use of various REC resources (Portal, Discussion Facility, and *Smart Learning* Programs) and their experience in using ICT (in general as well as at and outside the TTC). It also included items to measure perceptions of the extent use of active-learning pedagogies in TTC classrooms; as well as instructors' and students' perceptions of their effectiveness in using REC resources, in curriculum planning, interacting with peers to promote professional development, knowing their subject matter, knowing pedagogical approaches, teaching class sessions, assessing teaching, and evaluating student learning.

Here we will briefly discuss some of the preliminary findings based on analyzing these data. Table 2 presents the average responses of instructors for various measures in 2010, 2011, and 2012. In the right column we indicate whether or not changes from 2010-11, 2011-12, and/or 2010-12 are considered significant (i.e.,  $p < .01$ ). We will describe the findings for each variable in turn.

Variable	2010	2011	2012	Sig. Diff.
<i>Using Portal</i>	0.7	1.7	2.0	<.001 (10-11 & 10-12); <.01 (11-12)
<i>Using Discussion Facility</i>	0.4	1.1	1.2	<.001 (10-11 & 10-12); NS (11-12)
<i>Viewing SMART TV Program</i>	0.5	1.1	1.5	<.001 (all)
<i>Perceived Effectiveness in Using REC Resources</i>	0.7	1.3	1.6	<.001 (10-11 & 10-12); .002 (11-12)
<i>Active-Learning Pedagogical Strategies in TTC</i>	2.5	3.0	3.3	<.001 (all)
<i>Perceived Effectiveness in Curriculum Planning</i>	2.3	3.1	3.7	<.001 (all)
<i>Perceived Effectiveness in Knowing their Subject Matter</i>	2.5	3.2	3.8	<.001 (all)
<i>Perceived Effectiveness in Knowing Pedagogical Approaches</i>	2.4	3.1	3.8	<.001 (all)
<i>Perceived Effectiveness in Teaching Class Sessions</i>	2.4	3.2	3.8	<.001 (all)
<i>Perceived Effectiveness in Evaluating Student Learning</i>	2.4	3.3	3.8	<.001 (all)
<i>Perceived Effectiveness in Self-Assessment as a Teacher</i>	2.3	3.1	3.6	<.001 (all)
<i>Perceived Effectiveness in Peer Interaction for Professional Development</i>	2.0	2.9	3.5	<.001 (all)

Table 2: Average Scores of Instructors

### Indicators of use

*Using Portal.* Instructors significantly increased their use of the REC Portal between 2010 and 2012. In 2010 instructors reported that on average they used the Portal less than 1-3 times per year (0.7), while early in 2012 they reported that they had on average already used the Portal 4-7 times per year (2.0).

*Using Discussion Facility.* Instructors significantly increased their use of the REC On-Line Discussion Facility between 2010 and 2012. In 2010 instructors reported that on average they used the On-Line Discussion Facility less than 1-3 times per year (0.4), while early in



2012 they reported that they had on average already used the Discussion Facility over 1-3 times per year (1.2).

*Viewing SMART TV Programs.* Instructors significantly increased their viewing of the REC *Smart Learning* program between 2010 and 2012. In 2010 instructors reported that on average they had viewed a SMART TV Program less than 1-3 times per year (0.5), while early in 2012 they reported that they had on average already viewed a SMART TV Program between 1-3 and 4-7 times per year (1.5).

### **Indicators of teacher effectiveness**

*Use of Active-Learning Pedagogies.* Instructors significantly increased their use of active-learning pedagogies in their TTC classrooms between 2010 and 2012. In 2010 instructors reported that on average they used active-learning pedagogical strategies between less than once a month and 1-3 times per month (2.5), while early in 2012 they reported that they had on average already used active-learning pedagogies in their TTC classrooms between 1-3 times per month and 1-3 times per week (3.3).

*Perceived Effectiveness in Curriculum Planning.* Instructors significantly increased their perceived effectiveness in curriculum planning between 2010 and 2012. In 2010 instructors reported that on average they perceived themselves as between “somewhat effective” and “effective” in curriculum planning (2.3), while early in 2012 they reported that they perceived themselves as between “effective” and “very effective” in curriculum planning (3.7).

*Perceived Effectiveness in Knowing their Subject Matter.* Instructors significantly increased their perceived effectiveness in knowing their subject matter between 2010 and 2012. In 2010 instructors reported that on average they perceived themselves as between “somewhat effective” and “effective” in knowing their subject matter (2.5), while early in 2012 they reported that they perceived themselves as between “effective” and “very effective” in knowing their subject matter (3.8).

*Perceived Effectiveness in Knowing Pedagogical Approaches.* Instructors significantly increased their perceived effectiveness in knowing pedagogical approaches between 2010 and 2012. In 2010 instructors reported that on average they perceived themselves as between “somewhat effective” and “effective” in knowing pedagogical approaches



(2.4), while early in 2012 they reported that they perceived themselves as between “effective” and “very effective” in knowing pedagogical approaches (3.8).

*Perceived Effectiveness in Teaching Class Sessions.* Instructors significantly increased their perceived effectiveness in teaching class sessions between 2010 and 2012. In 2010 instructors reported that on average their perceived themselves as between “somewhat effective” and “effective” in teaching class sessions (2.4), while early in 2012 they reported that they perceived themselves as between “effective” and “very effective” in teaching class sessions (3.8).

*Perceived Effectiveness in Evaluating Student Learning.* Instructors significantly increased their perceived effectiveness in evaluating student learning between 2010 and 2012. In 2010 instructors reported that on average their perceived themselves as between “somewhat effective” and “effective” in evaluating student learning (2.4), while early in 2012 they reported that they perceived themselves as between “effective” and “very effective” in evaluating student learning (3.8).

*Perceived Effectiveness in Self-Assessment as a Teacher.* Instructors significantly increased their perceived effectiveness in self-assessment of themselves as teachers between 2010 and 2012. In 2010 instructors reported that on average their perceived themselves as between “somewhat effective” and “effective” in self-assessment of themselves as teachers (2.3), while early in 2012 they reported that they perceived themselves as between “effective” and “very effective” in self-assessment of themselves as teachers (3.6).

*Perceived Effectiveness in Peer Interaction for Professional Development.* Instructors significantly increased their perceived effectiveness in peer interaction for professional development between 2010 and 2012. In 2010 instructors reported that on average their perceived themselves as “somewhat effective” in peer interaction for professional development (2.0), while early in 2012 they reported that they perceived themselves as between “effective” and “very effective” in peer interaction for professional development (3.5).



## Appendix A: *Smart Learning* Broadcast Partners

*Smart Learning* broadcasts aim to demonstrate good teaching practices. REC has engaged four new partners, to promote the strong pedagogical work of each, to expand the variety of content demonstrated on the programs, and to challenge teachers to try some of the activities themselves in their own classrooms.

**Voluntary Service Overseas (VSO)** has placed a volunteer in many TTCs. Each of the volunteers is tasked to train student teachers on how to make and use teaching aids to improve learning in the classrooms. The *Smart Learning* Program films students learning how to make teaching aids followed by them practicing how to use the teaching aids when teaching both English and math to primary students. Over time the expectation is to follow some of the student teachers into the classroom during their practicum sessions with primary students.

**The International Education Exchange (IEE)** is a non-governmental organization that provides in-school mentors to a select number of primary schools in Rwanda. The mentors work one-on-one with Rwandan teachers to develop lesson plans, teach in the classroom using learner-centered teaching, and reflect on how well a lesson was conducted with students. In addition, the mentors serve as tutors for teachers to improve their English skills. REC filmed the process in which mentors support Rwandan English teachers—it will be a continuum from preparation, to teaching, then through a reflection period, in which viewers will see what good teaching practice entails. This filming began in January 2012.

**Japan International Cooperation Agency (JICA), Strengthening Mathematics and Science in Secondary Education (SMASSE) project** trains secondary school teachers across Rwanda on how to incorporate experiments into their science and math classes and create lesson plans that encourage more effective use of time in the classroom. SMASSE engages national and regional trainers to host intensive trainings directly with teachers. REC has been filming three of the projects trainers as they conduct science experiments with secondary school students.

**The United States Peace Corps** hosts a large number of volunteers that work directly in lower secondary schools to assist teachers with their English language acquisition and ultimately mentor them in more active learning methods. Since the volunteers are assigned to one school, the mentoring is very thorough. Volunteers work through lesson planning and then either co-teach or alternate teaching with their Rwanda counter parts. REC filmed the process in which the volunteers support their Rwanda counter parts. This will include planning of daily classroom activities and lessons as well as teaching in the classroom. This filming is due to start at the beginning of the Rwanda school year, late January 2012.



## Appendix B: Improvements to the REC portal (v3.0)<sup>3</sup>

No.	Feature	Description	Priority	Difficulty
<b>1</b>	<b>Home page</b>			
1.1	Home page images	The image at the top of the left-hand column on the home page should change with each page load. REC staff should have a simple way to add new images to this space.	High	Medium*
<b>2</b>	<b>Registration and sign-on</b>			
2.1	Improved registration flow	Improve the REC new user registration and sign-in flow so that the process is more user-friendly.	High	High*
2.2	User verification fix	Phone verification does not work. This should be either fixed or removed.	Urgent	High*
<b>3</b>	<b>Library front end</b>			
3.1	Print resource button	Add “print resource” button to the library, functional in all browsers, to print resources.	Medium	Low
3.2	Simple text search	Add search bar to library that searches the text of all library resources.	High	Medium*
3.3	Advanced search	Add “advanced search” option near search bar with the following search parameters: source, year, grade level, topic, and rating	Low	Medium*
3.4	Moderated user upload form	Create upload form so that community members can upload materials for moderators to review and post to the library.	Medium	High*
3.5	My Library	Add “save resource” button so that users can save a resource to their personal library. “My library” should be viewable on a separate page, linked through the user account. Users should be able to	Low	High*

<sup>3</sup> Revised from the previous biannual report.



		delete resources from their library.		
3.6	Back button fix	“Back” button should bring the user from a library resource page to the previous page viewed. Currently it brings the user to the library home page.	High	Low
3.7	User comments	User should be able to comment and view comments on resource pages.	Medium	Medium*
3.8	User ranking	User should be able to rank and view aggregate ranking of resources on resource pages (n of 5 stars).	Medium	Medium*
<b>4</b>	<b>Social</b>			
4.1	User profile	Add Google+ profile functionality to frame. “Welcome, user@domain.com” should be clickable to profile. User names through the site should be clickable to their Google+ profiles.	High	Medium*
4.2	School profile pages	Site admins should be able to add “school profile” pages containing text and images. School profile pages should be navigable from the main navigation bar.	Medium	Low*
<b>5</b>	<b>News</b>			
5.1	Blogger backend	News tool should be replaced with Blogger. Old news items should be migrated to new tool.	High	Medium
5.2	News formatting	Improve the usability of the News feature on the home and news pages.	High	Low
<b>6</b>	<b>Library back end</b>			
6.1	Improve admin library upload form	Create a smoother library upload flow with better navigation between form, list of resources, and data dump	Medium	Low
6.2	Copy/paste problem	Fix coding in library upload form description box - currently if a paragraph of text is copied/pasted, it displays on website with + and = signs throughout	Urgent	Low
6.3	Smart	When an admin chooses a category on the user	Medium	Low

	categories	upload form, relevant topics appear (e.g. If I select Academic subject, then Arts, Biology, Chemistry, etc. appear)		
6.4	Editable admin library upload form	Admins should be able to edit library upload form choices and instructions editable by admin (e.g. Grade level has no “Not Applicable” choice or we should be able to add a new subject. Admin should be able to edit that category to add a new option. If instructions have changed - admin should be able to edit the instructions)	High	Medium*
6.5	N/A grade level option	On Library upload form, add “Not Applicable” as grade level choice	High	Low
6.6	Admin-only use of library upload form	This form should not be accessible to non-admin.		



## Appendix C: Alignment of REC II with national policy and planning documents

REC II activities are designed to support and in some cases fulfill policy priorities set forth in the ESSP, NICI III, and the draft ICT in Education Policy and Costed Strategic Plan. They have been further informed by the Common Performance Assessment Framework (CPAF) contained within the revised Education Economic Development and Poverty Reduction Strategy (EDPRS), and the 2012 Joint Review of the Education Sector (JRES).

The table below maps proposed REC II activities with relevant policy and planning documents. Specifically, REC II aligns with the following sections of Rwanda's policy and planning documents:

- **ESSP:** REC II activities are directly aligned with section 3.1.3 of the ESSP, which lists 6 strategic priorities for the application of ICTs in education. Where the ESSP is indicated below, we refer to the ICT in education strategic priorities (except in Activity 8).
- **NICI III:** REC II activities are aligned with Project 8 of the NICI III Plan: a Training and Education Portal. Where NICI III is indicated below, we refer to this project.
- **ICT in Education Costed Strategic Plan:** The ICT in education costed strategic plan lists seven objectives and includes a detailed logframe. Where the costed strategic plan is indicated below (as ICT4E Plan), we refer to activities within this logframe. In addition to the alignments listed, REC II supports activity 2.2 (partnerships for ICT in education), 3.4 (innovation through partnerships), and 4.3 (innovative solutions).
- **CPAF Indicators:** Section 2.7.2 of the EDPRS CPAF indicators now includes policy action to support the national school-based mentorship program.
- **JRES:** The April 2012 JRES lists six priority areas with concrete action points, including priority areas for strengthening Rwanda's teachers. Areas where these action points guide REC II activities are indicated below.

REC II activity	Areas of alignment
1. Establish a National Education Portal	<ul style="list-style-type: none"> <li>• <b>ESSP 3.1.3/1:</b> “Building a common platform to...share resources and good practices”</li> <li>• <b>NICI III/Project 8:</b> “Develop and implement education portal”</li> <li>• <b>ICT4E Plan/1.3:</b> “Availability of online portal to raise awareness of ICT in Education”</li> <li>• <b>JRES/priority area action point 1:</b> “Implementation of 12 years basic education... equipping schools with learning materials”</li> <li>• <b>JRES/priority area action point 2:</b> “Improving teachers’ skills and working conditions...continuous up-skilling of teachers”</li> </ul>
2. Build capacity in support of a National Education Library	<ul style="list-style-type: none"> <li>• <b>ESSP 3.1.3/5:</b> “Developing and distributing quality digital content and ensuring that this content is adapted to the Rwandan context and aligned with the national curriculum”</li> <li>• <b>NICI III/Project 8:</b> “Create an e-Library”</li> <li>• <b>NICI III/Project 8:</b> “Digitization of curriculum and education materials”</li> <li>• <b>ICT4E Plan 5.1:</b> “Availability of digital content at all levels”</li> <li>• <b>JRES/priority area action point 1:</b> “Implementation of 12 years basic education... equipping schools with learning materials”</li> <li>• <b>JRES/priority area action point 2:</b> “Improving teachers’ skills and working conditions...continuous up-skilling of teachers”</li> </ul>
3. Build capacity and expand online platform in support of ODEL	<ul style="list-style-type: none"> <li>• <b>ESSP 3.1.3/6:</b> “Establishing Open Distance and e-Learning (ODEL)”</li> <li>• <b>JRES/priority area action point 2:</b> “Improving teachers’ skills and working conditions”</li> <li>• <b>JRES/priority area action point 5:</b> “Expand access to pre-primary and ECD”</li> </ul>

REC II activity	Areas of alignment
4. Extend <i>Smart Learning</i> and build capacity to produce educational broadcast programming	<ul style="list-style-type: none"> <li>• <b>ESSP 3.1.3/1:</b> “Promoting an ICT in education culture”</li> <li>• <b>ICT4E Plan/1.2:</b> “Availability of broadcast outreach material”</li> <li>• <b>ICT4E Plan/5.2:</b> Mobilizing partnerships for innovative solutions in digital content</li> <li>• <b>JRES/priority area action point 2:</b> “Improving teachers’ skills and working conditions...continuous up-skilling of teachers”</li> </ul>
5. Design solution for expanding connectivity access points	<ul style="list-style-type: none"> <li>• <b>ESSP 3.1.3/3:</b> “Expanding ICT infrastructure”</li> <li>• <b>ICT4E Plan 3.1:</b> “Availability of affordable power and equipment”</li> <li>• <b>JRES/priority area action point 2:</b> “Improving teachers’ skills and working conditions...continuous up-skilling of teachers”</li> </ul>
6. Design and establish e-rates for educators	<ul style="list-style-type: none"> <li>• <b>ICT4E Plan 3.2:</b> “Availability of affordable high-speed connectivity”</li> <li>• <b>JRES/priority area action point 2:</b> “Improving teachers’ skills and working conditions...continuous up-skilling of teachers”</li> </ul>
7. Build capacity among teachers using ICTs to promote strong teaching methods	<ul style="list-style-type: none"> <li>• <b>ESSP 3.1.3/4:</b> “Developing capacity to integrate the use of ICT into education practices through training of teaching staff on integrations of ICT into the teaching practice</li> <li>• <b>ICT4E Plan/1.4:</b> “Increased number of ICT in Education champions”</li> <li>• <b>ICT4E Plan/4.2:</b> “Improved capacity for integrating ICT into teaching, learning, and administrating”</li> <li>• <b>ICT4E Plan/7.1:</b> “Increased access to education through ODeL”</li> <li>• <b>JRES/priority area action point 2:</b> “Improving teachers’ skills and working conditions...continuous up-skilling of teachers”</li> <li>• <b>JRES/priority area action point 3:</b> “Improving the relevance of learning for a knowledge-based economy...equipping of schools with appropriate teaching and learning materials, and competency-based training”</li> <li>• <b>EDPRS CPAF Indicator 2.7.2:</b> “Initiate and monitor the first year of national school-based mentoring program”</li> </ul>

REC II activity	Areas of alignment
8. Support literacy and numeracy programs	<ul style="list-style-type: none"> <li>• <b>ESSP 1.8/2:</b> “Ensuring that education quality continues to improve through...English as a medium of instruction”</li> <li>• <b>ESSP1.8/3:</b> “Developing a skilled and motivated teaching, training and lecturing workforce through... the use of English as the medium of instruction”</li> <li>• <b>JRES/priority area action point 2:</b> “Improving teachers’ skills and working conditions...continuous up-skilling of teachers”</li> <li>• <b>JRES/priority area action point 3:</b> “Improving the relevance of learning for a knowledge-based economy...Improve English language skills...equipping of schools with appropriate teaching and learning materials, and competency-based training”</li> <li>• <b>EDPRS CPAF Indicator 2.7.2:</b> “Initiate and monitor the first year of national school-based mentoring program”</li> </ul>



## Appendix D: Sustainability connectivity report

### *Executive summary*

The Rwanda Education Commons (REC) has developed a store of digital content, and channels for the distribution of that content, including newsprint, television, and a best-in-class online portal. The REC portal was designed in partnership with Google and features a suite of Google technologies that enable teachers to better find quality educational materials, share ideas, and connect with each other. Scaling these tools requires sufficient connectivity and infrastructure to enable widespread use.

REC is currently supporting the Ministry of Education (MINEDUC) in expanding connectivity to 11 teacher training colleges (TTCs) and two teacher colleges of education (TCEs). In Q1 2010, REC purchased 9 VSAT dishes for the TTCs and subsidized bandwidth costs, which were already subsidized at approximately 80% of the true cost by the Rwanda Utilities Regulatory Agency (RURA) through its Universal Access Fund. This activity was coordinated with a large number of stakeholders: MINEDUC; the Teacher Service Commission, which oversees TTCs and TCEs; Artel, a nationalized bandwidth provider; UNICEF, which has contributed computer labs to all TTCs; and VSO, which is providing training materials through a separate UNICEF project at the TTCs.

Now REC seeks to design a sustainable, low-cost connectivity solution for TTCs so as to streamline existing operations, reduce costs, and enable entirely new ways of advancing access and support ICT in education applications across the network.

Rwanda is connected via redundant fiber optic cables to Kenya and Uganda, which have multiple connection points to global Internet fiber. Within Rwanda, the main ISPs in the country are ARTEL, ALTEC, BSC, MTN, Tigo and Rwandatel. Yet domestic broadband Internet costs are still elevated over those in neighboring countries. MTN and Rwandatel offer commercial fixed line bandwidth at 1Mbit down and 512Kbit up for about \$2000/month with mobile providers at about \$50 per 1Gibabyte of data. These different pricing schemes, bandwidth available vs. actual data usage, suggest that REC could have multiple solution options based on the current and future bandwidth use cases of TTCs.



To help REC better understand its current connectivity situation and plan for sustainable Internet access in the future, Inveneo reviewed the current ISP landscape, REC's VSAT infrastructure, TTC usage models, and alternate connectivity solutions. From this site survey and discussions with local ISPs, Inveneo developed a sustainability plan for the 11 TTCs that will maximize bandwidth usability with local support and maintenance. Inveneo also offers recommendations for expanding Internet connectivity to the TCEs and other educational institutions.

On the whole, Inveneo found that existing ICT infrastructure suffered from poor installation practices and ongoing support and maintenance issues, which were compounded by limited Internet bandwidth. This restricted the usability of the main REC website, not to mention the full gamut of resources offered by true broadband Internet access. At the high level, Inveneo has the following recommendations:

- The REC should work with the TTC's to institute regular ICT maintenance activities at each site to ensure that the current infrastructure and Internet bandwidth is being maximized.
- TTCs should optimize the use of Internet bandwidth by limiting full Internet access to select computers during high-congestion daytime hours, using offline resources to support the majority of users until greater bandwidth is available.
- REC and the TTCs should prioritize connecting to the national fiber optic backbone as its deployed around the country. The TTCs are in favorable geographic locations to do so.
- The REC and TTCs should engage local ICT firms for regular support, and maintenance services to ensure long-term implementation of Recommendation 1 and 2 and the efficient implementation of Recommendation 3.
- The TTCs should limit any bandwidth expansion plans - within TTCs or to external organizations - until they can connect to the national fiber optic backbone, as the current bandwidth cannot realistically support the TTCs now.

### *Sustainability recommendations*

#### **Recommendation 1: Perform Regular Support & Maintenance**

The REC should work with the TTC's to institute regular ICT maintenance activities at each site to ensure that the current infrastructure and Internet bandwidth is being maximized. Trained TTC staff, students, or volunteers, can perform regular basic





computer maintenance. Trained ICT technicians should do advanced maintenance and all installation activities.

At the minimum, VSAT coax cables should be repaired, switches and LAN cables should be organized for easy maintenance, and external LAN cables should be installed properly or replaced with short-distance wireless WiFi networking. Computers should be optimized for low- bandwidth connections<sup>2</sup> and protected with anti-virus to reduce extraneous bandwidth consumption - viruses can consume over 80% of a school's Internet bandwidth if not regularly removed.

Trained ICT technicians should perform these activities as soon as possible to improve ICT utilization and performance and protect the REC investment to date.

### **Recommendation 2: Optimize Internet Bandwidth**

In order to preserve the limited Internet bandwidth for mission critical activities, the majority of computers should be excluded from using Internet bandwidth during peak hours. Instead, the TTCs should implement a caching technology that pre-fetches content (e.g. overnight download) so regularly accessed content is stored on a local cache server at each TTC rather than having each computer trying to fetch these in real time from the Internet. This cache server will greatly speed up response times for static content on popular websites, like REC documentation and educational news sites.

The REC can also explore the provision of offline content repositories like the eGranary Digital Library<sup>3</sup>. The eGranary is a dedicated local server that provides over 14 million digital educational resources, each fully indexed and searchable using a built-in search engine. Because it is on the local network (vs. on the Internet), access to this content is nearly instantaneous and because it's curated for educational institutions, relevant content can be easier to find by a novice user than searching the full Internet.

TTCs can allow select computers to fully access the Internet during high-congestion daytime hours. Bandwidth allocation can be made on a priority basis - live teaching events have 1st priority, REC website interactions have 2nd priority, etc. Full access can be granted to all computers on nights and weekends, when overall bandwidth is greater.



TTC staff or students can regularly optimize web browsers for low bandwidth environments and train users how to maximize the bandwidth that is available. They can also identify sites that should be cached.

### **Recommendation 3: Connect to the Fiber network**

The current VSAT system can barely support the TTCs' bandwidth needs. WiMax infrastructure is too limited in coverage areas to be of use to the 11 TTCs. For a much more satisfactory Internet experience at the TTC's, the REC should prioritize connecting the TTCs to the national fiber optic network. While fiber bandwidth volume or prices have not been finalized, it will certainly offer true broadband connectivity and be a significant increase in Internet usability.

REC should initiate discussions with BSC to gain access to the fiber network as it is completed. As evidenced by the Caisse Social du Rwanda School, fiber connections are possible and affordable for educational institutions.

Independent of the FHI360/REC effort, Inveneo is in discussions with BSC to investigate expanding broadband Internet access to the rural areas of Rwanda through its Broadband for Good™ program<sup>4</sup>. The discussions include extending the reach the national fiber optic backbone, through use of low-cost, appropriate wireless last mile technologies, to connect organizations that are in need of broadband connectivity in rural Rwanda. This model has worked very well in Haiti and could be replicated in Rwanda in a way that includes the TTCs and nearby schools.

There is the possibility that the TTCs could server as "anchor tenants" - key nodes in the network if we deploy the Broadband for Good deployment model in Rwanda. At this point, the discussions with BSC are in the early stages with possible deployment of the first pilot sites in Q2 of 2012.

However, the fiber network nodes are not complete yet. While the TTCs would connect to the fiber backbone, without a clear understanding of the network nodes, their business model, technical approach, and exact location, it is impossible to discuss solution designs or implementation costs.



#### **Recommendation 4: Engage Local ICT Firms**

REC will need outside assistance to implement these recommendations. Inveneo can be a lead in the design of these solutions and manage their deployment. Yet a local ICT firm should carry out the actual activity in Rwanda. This is recommended so that the firm can also perform knowledgeable long-term maintenance and support for the REC.

Inveneo has developed a robust local ICT partner network in Rwanda with the following Inveneo Certified ICT Partners<sup>5</sup> able to deploy, maintain, and support the networking solutions identified above:

- Mr. Cyusa Mucyowiraba CyuDa Limited Stadium Street Kigali, Rwanda  
+250 78 85 59 810, [cyusalero@gmail.com](mailto:cyusalero@gmail.com)
- Sam Dargan Great Lakes Energy 4th Floor La Bonne Adresse Building Avenue de la Revolution Kigali, Rwanda  
+250-(0)78-865-6025, [info@energyforafrica.com](mailto:info@energyforafrica.com)
- Johnny Kayihura Rock Global Consulting Nyarutarama Road, MTN Center Kigali, Rwanda  
+250 788 30 31 33, [jkayihura@rockglobalconsulting.com](mailto:jkayihura@rockglobalconsulting.com)
- Mr. Ngamiye Herbert HBT Technologies Campus street P.O. Box 150 Nyagatare,  
+250 788 540 340, [nherbo@gmail.com](mailto:nherbo@gmail.com)

Mr. Ngamiye Herbert is already known to REC - he is the IT instructor at the Matimba TTC and one of the newest Inveneo Certified ICT Partners, having successfully completed training in November 2011.

#### ***Expansion Recommendations***

The current New Artel VSAT configuration does not appear expandable - the TTCs will not have any more or better Internet bandwidth via VSAT. The 2G EDGE mobile data service cannot support any better connectivity, and the WiMax is not yet covering enough of the country. In addition, the TTCs are too geographically distant for a cost-effective nationwide private long- distance WiFi network.

#### **Recommendation 5: Expand Network Once on Fiber**

In the current bandwidth environment, the REC should not entertain expansion through sharing of TTC bandwidth. There is not enough bandwidth for the TTCs as it is. But once



the TTCs are connected to the national fiber network, the REC could quickly expand to nearby schools and clinics.

In the site survey, we identified an average of 3 schools that are within approximately 2 kilometers of the 11 TTC locations. Rwanda has an infrastructure-sharing mandate that requires owners of towers and tall buildings to allow communications equipment to be installed to support the national communications infrastructure. Using this mandate and simple and cost effective wireless WiFi networking solutions, these schools could be connected to the TTCs, expanding the TTC network to at least 33 additional locations.

The REC and TTCs should engage local Internet Service Providers to build out the wireless networking between the TTCs and nearby schools, rather than trying to build their own private network. By buying it as a service, the REC and TTCs will be leveraging the vast experience of the ISPs in deployment and more importantly, ongoing maintenance of a wireless network. Taking this approach has a dramatic impact on costs - individual schools could be connected for around \$1,000 each, with maintenance costs imbedded in the Internet bandwidth subscription as a nominal fee.